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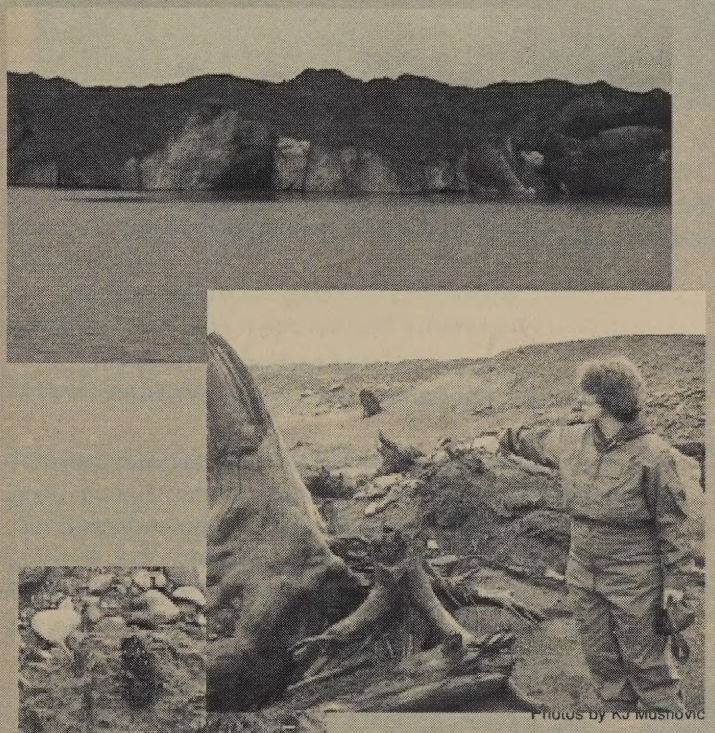
Retreating glacier reveals ancient forest

At 140 miles in length and some 34 miles wide, including the Bagley Icefield, the Bering Glacier is the largest glacier in continental North America. For decades, the Malaspina Glacier, at approximately 2,000 square miles, was thought to be the largest, but satellite imagery settled the question when the Bering Glacier was measured at more than 2,250 square miles.

In 1994 and 1995, major surges of the Bering Glacier attracted national media and scientific attention. The glacier became the subject of ongoing research projects by several institutions, including the Bureau of Land Management, U.S. Geological Services, the University of Alaska Fairbanks, the State University of New York, and the University of Washington. Researchers collecting data coordinate with the BLM's Glennallen Field Office (GFO), since much of the glacier includes public lands managed by GFO.



Photos by KJ Mushovic

Covering more than 2,250 square miles, the Bering Glacier (top) is the largest glacier on the North American continent. (center) As part of an interagency effort to identify key ecological sites for long-term environmental monitoring, scientists tagged huge stumps recently found at the glacier, evidence of an ancient forest floor under the glacier. Major glacier surges in 1994 and 1995 uncovered new moss and grass found growing on exposed layers of peat. Ice has been found below the peat, which could support a theory that the forest, with trees 160- to 250-years-old, developed on top of the glacier before being sheared off by a glacial surge.

Receding ice reveals sinking ancient forest

KJ Mushovic

At 140 miles in length, some 34 miles wide, and encompassing 2,250 square miles, including the Bagley Icefield, the Bering Glacier is the largest glacier in continental North America.

On an isolated section of the Bering Glacier, animated voices carry on a brisk wind.

"Hey, you guys!" comes an excited cry. "What about this one?"

"This tree looks like it's in situ — look at the splintering," enthuses another.

"That one must be in place. The roots are all right where they are supposed to be," admires a third.

At first glance, the source of the observers' interest appears to be just some dead trees and driftwood, but to this group of University of Alaska Fairbanks (UAF) scientists and researchers, the stumps and limbs pose both a mystery and the possibility of an unusual find — the remains of an ancient forest.

Roll back the clock to the end of summer, 1998. John Payne, the Bureau of Land Management's Alaska State Office wildlife biologist, is working at the Bering Glacier, studying dusky geese habitat and changes in the glacier that might affect vegetation growing in the surrounding area. Payne has conducted field work at the Bering Glacier for years and is familiar with its terrain.

Enroute to his field camp one day, he notices tree stumps in an area where the glacial ice is receding. The stumps stand out in what is usually a barren landscape, prompting Payne to investigate. He is startled to find twigs, spruce needles and spruce cones scattered around the area — debris and ground cover that would normally be scraped away by a glacial advance. Pocketing a few samples, Payne resumes his flight and continues with his work. Once he returns to Anchorage, he contacts Marilyn Barker, a University of Alaska Anchorage botanist, who consults with paleontology professor emeritus Anne Pasch. Pasch has experience working at fossil forests at Wishbone Hill near Sutton and on Unga Island. Both Barker and Pasch are in-

Bering Glacier identified as key ecological site

In 1997, BLM proposed that the Bering Glacier be included in the Global Fiducial Site Program, an interagency initiative that identifies key ecological sites for long-term environmental monitoring. Using remote sensing systems, the program follows National Technical Means (NTM) of data collection that support national data.

Under a complex ranking system, the Bering Glacier site was identified in 1998 as the fourth priority for inclusion, out of more than 400 nominations.

Work accomplished in 1999 by a team of BLM Washington Office, Wyoming State Office, and Alaska cadastral survey personnel improved the infrastructure for future data collection under the program.

KJ Mushovic

Kristine Crossen, the University of Alaska Fairbanks geology department chair and a geologist herself, and helicopter pilot John Tucker look at new moss growth on recently uncovered layers of peat. New grass was found growing on a piece of peat from the former forest floor and ice has been found below the peat, which could support a theory that this forest developed on top of the glacier, before being sheared off by a glacial surge.

trigued and suggest that Kristine Crossen, the University's geology department chair and a glaciologist, be included in the study group. Payne arranges for the women to make a one-day trip to the site in early fall. More samples are taken and plans are made to return in 1999 for a more thorough survey.

In August 1999, Barker, Crossen and Pasch begin their field inventory, enlisting botanist Peggy Pletcher to provide photographic documentation of their work. The group receives an orientation to the site from Wilderness Helicopters pilot and frequent visitor John Tucker, and then sets out to systematically document the locations and characteristics of the trees, surrounding soils and site geology.

Crossen takes advantage of the presence of Gust Panos, chief of BLM-Alaska's branch of mapping sciences, to discuss a plan for using BLM's Geographic Information System (GIS) capabilities, and access to satellite imagery as a means to possibly determine more about the nature of glacier advances.

With the periodic crash and splash of chunks of glacier falling into the nearby water punctuating conversations, the researchers share some of their thoughts about the site. When asked about her interest in the discovery, Barker allows she used to be involved only in "living" projects, but since meeting Pasch, she has developed an interest in prehistoric plant life. Gesturing at a patch of nearby moss, she describes it as "opportunistic" and mulls the possibility of the moss being introduced to the site since the glacier's retreat. Barker pauses to more closely examine cup fungi (small mushrooms) emerging from a piece of downed wood.

"I wouldn't have expected these to be growing out of the wood — the growth [of the cup fungi] is disintegrating this piece. I have to wonder if the fungi has been sitting dormant all this time until the right conditions occurred."

Glances are exchanged and half-joking remarks made about spores and viruses un-

continued on page 4

A person could easily stand within the shelter formed by the great, twisted roots of this stump. The splintering dramatically illustrates the mighty force of glacial action. The large root systems of the sheared-off stumps implies that the trees had been growing vigorously prior to being overrun by the advancing glacier.

KJ Mushovic

Discovery sparks interest at Bering Glacier cont'd

KJ Mushovic

Researchers are trying to determine if the soil and debris level atop a glacier provided an adequate environment for trees to grow this large during their estimated 160- to 250-year life span?

known to modern man being reintroduced to the atmosphere. "Actually," reassures Barker, "I think this is a fairly pristine system. Even if something from the time before these trees were overrun has been released, it's unlikely to be toxic."

From the 17th century to the late 19th century, the world experienced a "little ice age," when temperatures were consistently cool enough for significant glacier advances. Tree ring counts indicate the Bering specimens were between 160 and 250 years old when overrun by the glacier. Carbon dating tests conducted on samples from the glacier should confirm if the trees were encased for hundreds, or even thousands, of years before being released from the grip of glacial ice in 1998.

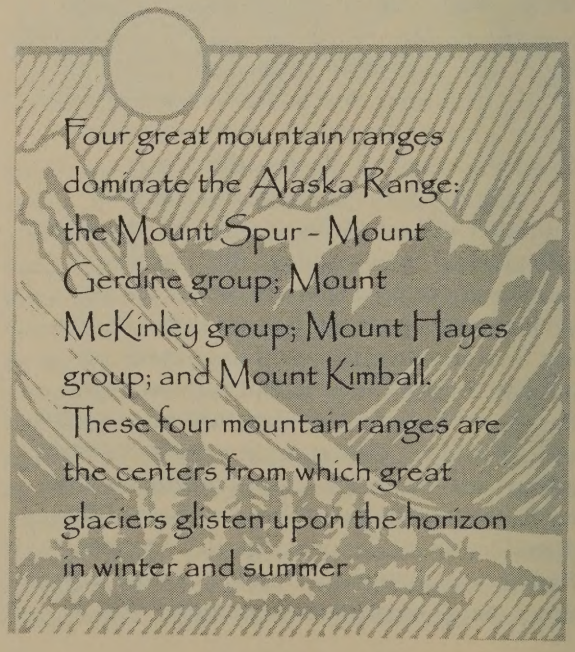
Typically, chunks of rock are picked up and incorporated into the glacial ice, resulting in advancing glaciers acting something like enormous scouring pads. They usually scrape across the land, grinding and polishing, then leaving long scratch marks, erosional features, and rock rubble, or till, at their terminus when they finally recede. So, why are these tree stumps still standing?

Barker admits, "I haven't got a good explanation as to why these trees survived or why they were sheared off at the six foot level — split into two sections with an intact peat layer at the bottom — so intact, in fact, that you can still see spruce cones and spruce needles. The only thing I've ever seen that looked anything at all like this was at Mount St. Helens."

Crossen considered the possibility that the trees may have been growing on the glacier when overrun by a new advance. "We found ice under the peat layer, which suggests that this forest grew on a layer of debris which accumulated on the surface of a stagnant ice lobe. After a few hundred years, the mature forest was overrun and buried by a new ice advance. Look at the Matanuska Glacier," points out Crossen. "One side of the glacier has debris on top that actually supports forest growth. At first glance, it just looks like an ordinary forest, but if you look closely, you can see ice beneath it."

Ice melting beneath the site threatens to lower the surface of the forest until it sinks into an arm of Vitus Lake. However, those who have seen it are excited by the possibility of uncovering the secrets of this "ancient forest" and plan to continue efforts to unravel the mystery of the six-foot high "stumps."

—KJ Mushovic


Four great mountain ranges dominate the Alaska Range: the Mount Spur - Mount Gerdine group; Mount McKinley group; Mount Hayes group; and Mount Kimball. These four mountain ranges are the centers from which great glaciers glisten upon the horizon in winter and summer

Prescribed fire planned for the Alphabet Hills

In the heart of State Game Management Unit 13, nestled between the Glenn, Richardson and Denali Highways, lie the Alphabet Hills. Each fall, hundreds of hunters make their way to the area by trail or by air, seeking big game. It's a good area for hunting, but it could be even better in the future.

The Bureau of Land Management's Glennallen Field Office (GFO), together with the Alaska Department of Natural Resources, Division of Forestry, Tazlina Office; the Alaska Department of Fish and Game, Glennallen Office; and BLM's Alaska Fire Service, is planning a June 2000 prescribed burn just south of the Alphabet Hills, north of Lake Louise.

The burn is intended to improve winter moose habitat by restoring diversity to the age and variety of vegetation in the area. The fire will affect approximately 28,000 to 39,000 acres and may take place as early as June 15, if weather and other conditions indicate that the burn can take place safely.

"We hope to burn between 50 and 70 percent of the targeted area, through a combination of severe to moderate fire intensity," says GFO fire officer John Rego, "to restore a mosaic of early to mid-succession vegetation, and prompt the sprouting and seeding of fire dependent species, just as a natural fire would. You know, creating fuel breaks through controlled burning like this also reduces the potential for a large wildfire, too."

Carrying out the burn safely is of primary importance. The fire will be ignited by a Type 1 hotshot crew, and monitored. While the fire will not be ignited if fog or the potential for inversion exists, weather variables may carry the sight or smell of smoke to the communities of Lake Louise, Glennallen, Paxson, and the Glenn, Richardson, and Denali highways.

"We want to emphasize the hazards of entering the area during the burn," cautions Rego. "We'll make sure that the FAA's flight service and Alaska State Troopers are kept informed of the status of the burn, but we want to ensure that visitors avoid the area."

BLM will provide full protection from the fire to known structures located on private property, or those located on public lands with known prior and valid existing rights.

GFO realty specialist David Mushovic notes, "Private property left or stored on public lands without proper authorization is solely the responsibility of its owner(s). It really shouldn't be there in the first place and it should definitely be removed prior to the burn."

A public meeting about the burn was held in Glennallen on March 15, 2000, and efforts continue to ensure that area residents and visitors remain informed during the planning and execution stages of the burn.

—KJ Mushovic

For further information, contact the Bureau of Land Management's Glennallen Field Office at 907.822.3217 or P.O. Box 147, Glennallen, Alaska 99588.

Campbell Creek — the Sun Moves It

Up from the Northern Pacific
To the clouds of the Chugach Range
Sun moves the water
Chilled to crystalline symmetry
Piled deep in valleys
In shadows for later
Flake by flake the sun
Frees those drifts to flow
Moving downhill
Moose wade and drink here
Ravens rattle the silence
A sow and her cubs listen
Cottonwood, alder and willows
Devils club, Labrador tea,
Canadian dogwood
Different scents drawing water
Sun on the leaves
Moves it up stem
Cell by cell
Salmon eggs swell and twitch
Membranes tear
And the new fish breathe
The stream that
The Sun moves
From ocean to mountain
Then downstream
Nourishment taken
The fish flow to sea
Lynx, martin or vole
Make their lives
And pause to drink
Wolf tracks fresh
At the water's edge
Disappear in the current
Later, sunlit
At the edge of water
We look and learn
Learn to see the light
And see the shadow
Finding the edges
Across the ocean
A salmon turns
To scent this stream
After the hard swim,
Belly on the rocks home
Who knows where it will end?
Spawn to begin again
Or the flash of a grizzly paw
Or eagle talon piercing the scales.
Up from the Northern Pacific
To the clouds of the Chugach Range
Sun moves the water
And we stand at the edge
Surrounded by what grows here
While the Sun moves it all
—Gene Ervine

BLM poet takes top honors in DOI contest

"Surprised!" is how Gene Ervine describes winning first place in the Department of the Interior's 150th anniversary poetry contest. Ervine, interpretive specialist at the BLM Alaska State Office since 1990, is best known for his interpretive work, but close friends also know him as an accomplished and prolific poet. Ervine's winning submission, *Campbell Creek, the Sun Moves It*, beat 49 other entries. Two years ago, he wrote the poem about the cycle of the Campbell Creek and its effects on lands and wildlife in Anchorage.

A self-described shy guy, Ervine admits to being the author of about 200 poems. He is presently working on the development of the Arctic Interagency Visitor Center in Coldfoot, Alaska.

After vining peas and logging, he began his career with the Department of the Interior in 1976 as a laborer with the National Park Service and worked as a exhibits preservation specialist and exhibits planner before coming to BLM in 1990.

— Danielle Allen

BLM helps marathon mapping project

People planning to run in the next Mayor's Midnight Sun Marathon Race and other races in Anchorage will have a new tool to plot their strategy, thanks to cooperative efforts from the Bureau of Land Management, the Municipality of Anchorage (MOA) and University of Alaska Anchorage (UAA), plus state-of-the-art satellite technology.

The result is a scale map of the race profile — that is, a "side view" showing all the ups and downs accurate to within two feet. The profile was requested for years by runners, who come from all corners of the United States.

The map, based on data collected this winter by BLM biologist Dayle Sherba, is now being produced by the MOA Parks and Recreation Department and students from the UAA.

"We mapped about 40 miles of race routes in less than five hours, beginning at the main gate of Ft. Richardson and going all the way down to Point Woronzoff," says Sherba.

How was so much accomplished so quickly? Sherba, along with Kelly Cravens from Parks and Recreation, Donna Brechan and Bill Lee from UAA, and BLM Anchorage Field Office recreation planner Jake Schlapfer, ran three snowmobiles along the race route that skirts BLM's Campbell Tract. Sherba packed one of BLM's Trimble Pathfinder ProXR GPS receivers and took continuous readings.

Ed Bovy

Dale Sherba uses BLM's Trimble Pathfinder GPS receiver to map the route for the Mayor's Midnight Sun Marathon Race.

"We had all the logistics planned for a quick snowmobile foray," says Sherba. "We made a mad dash when the weather warmed up to 10 above."

After processing the data to correct it for better accuracy, she passed it on to Bill Lee at UAA to convert it for final drafting.

Driving snowmachines on city trails is strictly prohibited, so the survey group received a special use permit from the city. Nevertheless, "we received puzzled and shocked looks from a few skiers until we explained we were on an authorized survey mission," says Sherba.

The only alternative was to wait for breakup and transport the equipment by bicycle, but it would have been impossible for the map to be completed in time for the next race.

—Ed Bovy

Ed Bovy

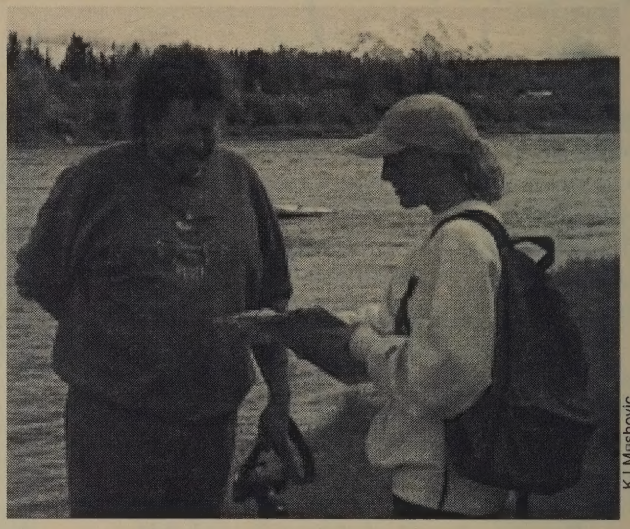
The survey team checks their location near Pt. Woronzoff before mapping additional race routes.

University analyzes Gulkana River surveys

In response to budget and contract challenges, BLM is no longer working with the contractor TGM Planning and Ecosystem Management to conduct Gulkana River planning studies. Public meetings are postponed until additional field and survey information is collected. Fundamental goals and methods of the planning effort remain, and BLM will continue to coordinate with the State of Alaska and Ahtna, Inc. Kathy Liska of BLM's Glennallen Field Office (GFO), says, " We hope to complete the work TGM started by fall of 2000, including documentation of visitor use levels, inventory of campsites, assessment of impacts at camps and on trails, and surveys of river and trail users about their trips and management preferences."

In November 1999, BLM sent surveys to a random sample of 600 users contacted over the summer, including 29 guides. More than 60% have returned the surveys, which allows researchers to characterize user opinions about the river and their trips, and management options. By summer, BLM hopes to publish a summary newsletter with key findings, as well as a longer report for use during the planning process. Liska says, "Analysis of the surveys is being conducted by Colorado State University, with a report due this spring. The findings will be summarized and published in a newsletter and on the new planning studies website."

—KJ Mushovic



KJ Mushovic

Contractors, affectionately referred to as "the survey girls," spoke with and collected information from a variety of Gulkana River users at several times and locations.

The website for the Gulkana River planning studies will be available via a link from the Glennallen Field Office website at: www.glennallen.ak.blm.gov. If you would like to be added to the mailing list for Gulkana River planning studies, contact the Glennallen Field Office at (907) 822-3217, or write to P.O. Box 147, Glennallen, Alaska 99588.

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